

What is Claimed is:

1. A backup power supply built in a power supply circuit for converting an alternating current received  
5 from a commercial AC power supply to a direct current and a load operated by said current generated by said power supply circuit, comprising:

at least one AC-DC converter connected to said commercial alternating current, a load connected to a  
10 DC output side of said AC-DC converter, at least one two-way DC-DC converter with one side thereof connected to said DC output side, and a secondary battery connected to another side of said two-way DC-DC converter, wherein:

15 when a load current is a predetermined peak cut current or larger, said backup power supply supplies a differential current between said load current and said predetermined peak cut current to said load from said secondary battery via said two-way DC-DC  
20 converter.

2. A backup power supply according to Claim 1, wherein

when said load current is smaller than said  
25 predetermined peak cut current, said backup power

supply supplies said load current from said AC-DC converter, charges said secondary battery using said two-way DC-DC converter by a charging current having an upper limit of a predetermined current, takes in  
5 only a current equivalent to a differential current between said predetermined peak cut current and said load current from said two-way DC-DC converter.

3. A backup power supply built in a power supply  
10 circuit for converting an alternating current received from a commercial AC power supply to a direct current and a load operated by said current generated by said power supply circuit, comprising:

at least one AC-DC converter connected to said  
15 commercial alternating current, a load connected to a DC output side of said AC-DC converter, at least one two-way DC-DC converter with one side thereof connected to said DC output side, and a secondary battery connected to another side of said two-way DC-  
20 DC converter, wherein:

when a load current is a predetermined peak cut current or larger, said backup power supply supplies a differential current between said load current and said predetermined peak cut current to said load from  
25 said secondary battery via said two-way DC-DC

converter and performs a peak cut operation and when  
said load current is smaller than said predetermined  
peak cut current, said backup power supply supplies  
said load current from said AC-DC converter and  
5 charges said secondary battery via said two-way DC-DC  
converter.

4. A backup power supply according to Claim 3,  
wherein said charging current for charging said  
10 secondary battery has an upper limit of a  
predetermined current and said backup power supply  
takes in only a current equivalent to a differential  
current between said predetermined peak cut current  
and said load current from said two-way DC-DC  
15 converter and charges said secondary battery.

5. A backup power supply according to Claims 1 or 3,  
wherein  
said backup power supply has detection means for  
20 detecting said charging and discharging currents of  
said secondary battery, means for detecting a voltage  
of said secondary battery, and a circuit for  
calculating a residual capacity of said secondary  
battery and changes said predetermined peak cut  
25 current according to said residual capacity of said

secondary battery.

6. A backup power supply according to Claim 5,  
wherein

5 when said residual capacity of said secondary  
battery is reduced lower than a predetermined capacity,  
said peak cut operation is stopped.

7. A backup power supply according to Claim 5,  
10 wherein

when said residual capacity of said secondary  
battery is reduced lower than said predetermined  
capacity at a time of service interruption or at a  
time of occurrence of a fault of said AC-DC converter,  
15 a discharge operation is performed.

8. A backup power supply according to any one of  
Claims 1 to 3, wherein

from said residual capacity of said secondary  
20 battery and said load current, said backup power  
supply has a function for calculating and displaying a  
service interruption holding time at said point of  
time.

9. A backup power supply according to any one of Claims 1 to 3, wherein

from said residual capacity of said secondary battery and said load current, said backup power supply calculates said residual capacity of said secondary battery necessary to ensure a predetermined service interruption holding time at said point of time and performs said peak cut operation within a range having said calculated residual capacity.

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10. A backup power supply according to any one of Claims 1 to 3, wherein a voltage at a connection point of said AC-DC converter and said two-way DC-DC converter is higher than a voltage of said secondary battery, and when said two-way DC-DC converter is discharged from a side of said secondary battery, said converter is operated as a booster chopper circuit, and when said secondary battery is charged, said converter is operated as a voltage reduction chopper circuit.

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11. A backup power supply according to any one of Claims 1 to 3, wherein

said backup power supply has n storage means for dividing a preset time period into n parts by a

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sampling time sufficiently shorter than said period  
and corresponding to said divisions, means for  
detecting said load current, and means for calculating  
a mean value of load currents from said detected load  
5 current and a last value stored in corresponding  
storage means, overwriting in said corresponding means,  
and changing said predetermined peak cut current from  
said calculated new mean value of load currents.

10 12. A backup power supply according to Claim 11,  
wherein

said preset time period is 24 hours.

13. A backup power supply according to Claim 11,  
15 wherein

said preset time period is one week.

14. A backup power supply comprising an AC-DC  
converter connected to a commercial alternating  
20 current, a load connected to a DC output side of said  
AC-DC converter, a DC-DC converter with one side  
thereof connected to said DC output side, and a  
secondary battery connected to one side of said DC-DC  
converter, wherein

25 said DC-DC converter has means for alternately

switching a short-circuit mode for short-circuiting  
said secondary battery and an inductance by a  
switching element and a booster mode for ejecting  
energy stored in said inductance in said short-circuit  
5 mode to said load, means for detecting an inductance  
current in said booster mode, and mean for averaging  
said inductance current in said booster mode, and only  
when a result obtained by subtracting a predetermined  
peak cut current level from said load current is  
10 positive, sets said value as a peak cut current  
command value, compares said value with said averaged  
current, and controls a ratio of said short-circuit  
mode to said booster mode.

15 15. A backup power supply built in a power supply  
circuit for converting an alternating current received  
from a commercial AC power supply to a direct current  
and a load operated by said current generated by said  
power supply circuit, comprising:

20 at least one AC-DC converter connected to said  
commercial alternating current, a load connected to a  
DC output side of said AC-DC converter, at least one  
two-way DC-DC converter with one side thereof  
connected to said DC output side, a secondary battery  
25 connected to another side of said two-way DC-DC

converter, a service interruption fault detection  
circuit portion connected to said commercial  
alternating current, a two-way operation mode change-  
over circuit portion, a drive signal change-over means  
5 for changing over a drive signal of said two-way DC-DC  
converter by receiving a signal which is output by  
said two-way operation mode change-over circuit, a  
discharge control circuit portion for outputting a  
discharge control signal to said two-way DC-DC  
10 converter through a drive signal change-over means,  
and a SOC calculation portion for calculating a  
residual capacity of said secondary battery, wherein  
an output of said SOC calculation portion is  
received by said charge control circuit portion.